

UK Patent Application

GB 2 263 667 A

(43) Date of A publication 04.08.1993

(21) Application No 9201788.8

(22) Date of filing 28.01.1992

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(51) INT CL⁶
B60R 21/20

(52) UK CL (Edition L)
B7B BSB

(56) Documents cited
EP 0367324 A2

(58) Field of search
UK CL (Edition K) B7B BSB
INT CL⁶ B60R
Online database: WPI

(54) Covers for vehicle air bags

(57) The cover is made of a continuous body of thermoplastics reinforced by glass fibres, the fibres being substantially evenly distributed throughout the complete volume of the polymer body, and being stochastically oriented. The thermoplastic may be polypropylene, polyamide, polybuteneterphthalate, and the cover may be provided during moulding with a metal hinge member.

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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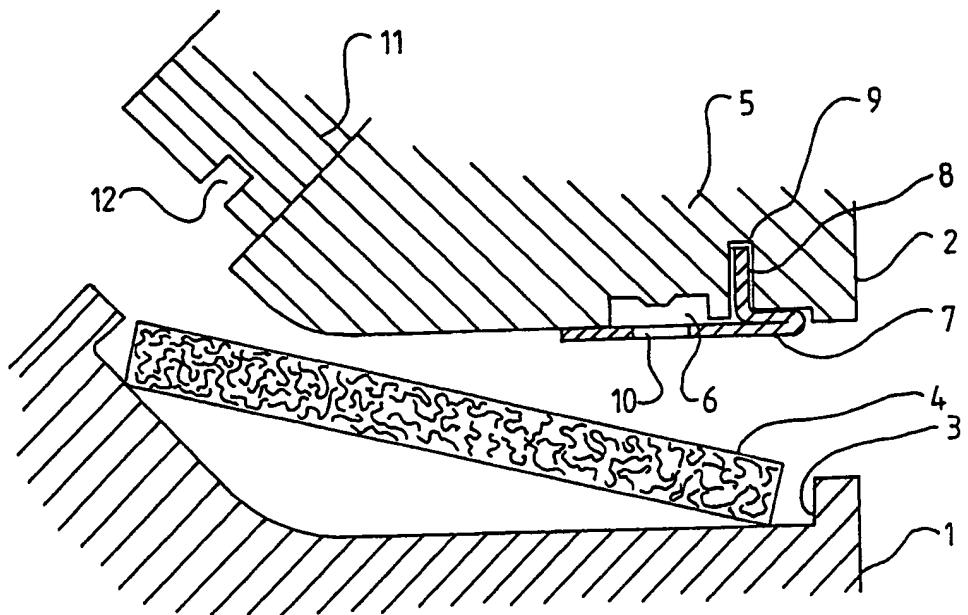


FIG 1

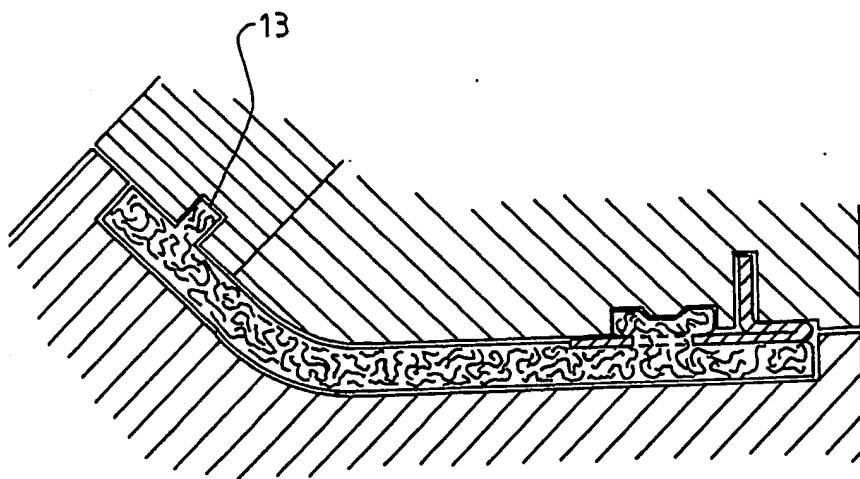


FIG 2

2 1 2

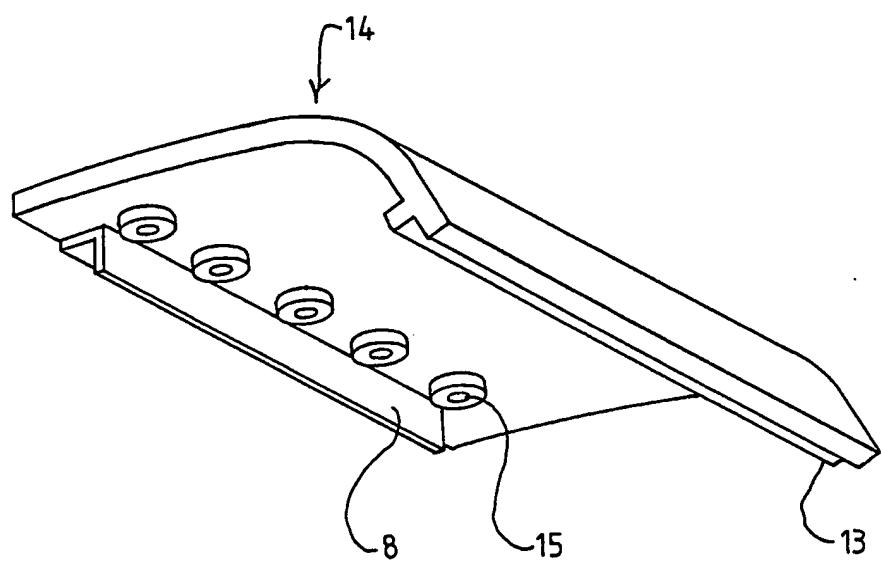


FIG 3

Title: "Improvements in or relating to an installation for an air bag"

Description of the Invention

The present invention relates to an installation for an air bag.

It is now relatively common for an inflatable bag called an air bag, to be installed in a motor vehicle in front of the driver or a passenger in the vehicle, means being provided to inflate the bag in the event that an accident arises. The bag thus acts to cushion the driver or passenger.

Typically an air bag is installed in a compartment, in a folded condition, the compartment having a cover which normally serves to close the compartment and which is designed to open when the bag is inflated.

Since the bag may be inflated by means of a pyrotechnic charge, the cover may be opened very violently and there is consequently a risk that the cover will break or crack. This may lead to parts of the cover hitting the occupants of the vehicle which is clearly undesirable.

It has been proposed to overcome this problem by forming the cover of plastic reinforced with woven fabric or even with a metal sheet core. Alternatively it has been proposed to make the cover from soft plastic which is reinforced with a hard plastic or metal core.

However, if the cover has a complicated shape it is difficult to arrange for the reinforced fabric or the plastic or metal core to extend throughout all of the parts of the cover. The metal core can be rather heavy, which is clearly undesirable.

Many of the previously proposed covers have been made of thermo-set plastics material, and these materials tend to get brittle at low temperatures. A cover for an air bag installation should have the desired properties over a wide temperature range of from - 40°C to + 90°C.

The present invention seeks to provide an improved cover for an air bag installation.

According to this invention there is provided a cover for an installation which comprises a compartment for retaining a folded inflatable bag, the cover being designed to open when the bag is inflated, the cover being made of a continuous body of polymer material reinforced by fibres, the fibres being substantially evenly distributed throughout the complete volume of the polymer body, and being stochastically orientated, the polymer being a thermo-plastic polymer material.

Preferably said fibres are made of glass.

Conveniently the average length of the fibres is greater than 10 cm.

Preferably the thermo-plastic is polypropene or polyamide.

Conveniently the thermo-plastic material is polybuteneterphthalate.

Preferably a metal element is secured to the body of thermo-plastic material, the metal element being provided with one or more cut-outs or apertures, and the main part of the body of thermo-plastic material being located on one side of the metal element, with parts of the said body extending through the cut-outs or apertures to secure the metal element to the body.

The invention also relates to an installation for an inflatable bag in a vehicle having a cover as described above the cover being flush with the dashboard of the vehicle.

The invention also relates to a method of producing a cover for an installation for an air bag, the method comprising the steps of locating in a mould an element of thermo-plastic material, the element containing reinforcing fibres, which are stochastically orientated and substantially evenly distributed throughout the element, and elevating the thermo-plastic to a temperature above the softening temperature but below the melting temperature, while plastically forming the element to the desired shape of the cover.

The invention further relates to a method of producing a cover for installation for an inflatable bag in a vehicle, the method comprising injection moulding a thermo-plastic material which is reinforced with fibres which are stochastically orientated and substantially evenly distributed through the cover at the end of the moulding process.

Preferably a metal element is located within the mould before the thermoplastic is introduced into the mould, the element being provided with cut-outs, the plastic material, being pressed through the cut-outs during the moulding process so that the metal element is secured to the cover at the end of the moulding process.

Conveniently the fibres comprise glass fibres.

Preferably the thermo-plastic material is polypropene or polyamide.

Advantageously the thermo-plastic material is polybuteneterphthalate.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 illustrates a block of thermo-plastic material, from which a cover for an air bag installation is to be made, located in a mould, with the mould parts being shown in the open condition;

FIGURE 2 shows the arrangement of Figure 1 when the mould parts are in a closed condition; and

FIGURE 3 is a perspective view of the cover made in the mould illustrated in Figures 1 and 2.

Referring initially to Figure 1 a cover for an air bag installation is to be fabricated in a mould comprising a lower mould part 1 and an upper mould part 2. The lower mould part 1 defines a moulding cavity 3 in which is located a block 4 of a thermo-plastic material, as will be described hereinafter in greater detail.

The upper mould part 2 is of a two-piece construction, comprising a first piece 5 which defines a recess 6 and which carries a metal hinge element 7. The hinge element presents an arm 8 intended to be outstanding from the cover to be fabricated and this arm is retained within a recess 9 formed in the mould piece 5. The hinge also defines a cut-out or aperture 10 in alignment with the recess 6. The second mould piece 11 is movable relative to the first mould piece 5, and defines, at its lower edge, a moulding recess 12.

The mould is provided with means adapted to heat the mould since the block 4 of material is a block of thermo-plastic material. The material is reinforced with stochastically orientated fibres which are evenly distributed throughout the block. The fibres are randomly orientated and are preferably formed of glass. The average length of the fibres is more than 10 cm.

The body 4 may be made of any appropriate material such as a polypropene, and polyamide or polybuteneterphthalate, this last material being preferred.

It is to be appreciated that when the block 4 of thermo-plastic material has been located within the mould the upper mould part 2 will be lowered down towards the lower mould part 3, thus pressing the thermo-plastic block 4 into the mould cavity 3.

The temperature of the mould is such that the thermo-plastic block is heated to a temperature at which it will soften, but not melt, and part of the thermo-plastic material, together with the fibre reinforcement, will pass through the aperture 10 formed in the hinge 7, to fill the cavity 6. The second piece 11 of the upper mould part 2 moves to the position in Figure 2, and a portion of the thermo-plastic block enters into the mould recess 12 forming a rib 13 which serves to stiffen the cover, and to lock the cover.

The upper part 2 of the mould is then retracted, and the moulded cover can be removed from the mould recess 3. The resultant cover 14 is illustrated in Figure 3.

The main part of the cover, formed from the body of fibre reinforced plastic material, lies on one side of the metal element 7. The projecting metal arm 8 of the hinge element 7, extends away from the main part of the cover and can be connected to an appropriate hinge arrangement. A row of projections 15 are visible adjacent the arm 8, these projections being formed by the portions of the thermo-plastic material that pass through the cut-outs or apertures in the metal element 7 into the recesses 6 formed in the first upper mould part 5. These portions of thermo-plastic material secure the metal element to the rest of the cover. The flange 13 provides a stiffening effect for the cover 14, and also locks the cover 14.

The cover 14 can be mounted on an installation for an air bag, with the cover being flush with the dashboard.

While the invention has been described with reference to an example in which a preferred block of thermo-plastic material is inserted into a mould cavity, in an alternative embodiment of the invention, a cover is formed by injection moulding a molten thermo-plastic material reinforced with short fibres than those described above into a mould having a configuration such as that described above with reference to Figures 1 and 2 of the drawing. However, if an injection moulding technique is utilised, it may well be found necessary to utilise shorter fibres than those described above.

In any event it is to be appreciated that the fibres reinforcing the thermo-plastic material are stochastically orientated in the final product and are evenly distributed throughout the final product.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in the terms or means for performing the desired function, or a method or process for attaining the disclosed result, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

1. A cover for an installation which comprises a compartment for retaining a folded inflatable bag, the cover being designed to open when the bag is inflated, the cover being made of a continuous body of polymer material reinforced by fibres, the fibres being substantially evenly distributed throughout the complete volume of the polymer body, and being stochastically orientated, the polymer being a thermo-plastic polymer material.
2. A cover according to claim 1 wherein said fibres are made of glass.
3. A cover according to claim 1 or 2 wherein the average length of the fibres is greater than 10 cm.
4. A cover according to any one of the preceding claims wherein the thermo-plastic is polypropene or polyamide.
5. A cover according to any one of claims 1 to 3 wherein the thermo-plastic material is polybuteneterphthalate.
6. A cover according to any one of the preceding claims wherein a metal element is secured to the body of thermo-plastic material, the metal element being provided with one or more cut-outs or apertures, and the main part of the body of thermo-plastic material being located on one side of the metal element, with parts of the said body extending through the cut-outs or apertures to secure the metal element to the body.
7. An installation for an inflatable bag in a vehicle having a cover according to any one of the preceding claims, the cover being flush with the dashboard of the vehicle.

8. A method of producing a cover for an installation for an air bag, the method comprising the steps of locating in a mould an element of thermo-plastic material, the element containing reinforcing fibres, which are stochastically orientated and substantially evenly distributed throughout the element, and elevating the thermo-plastic to a temperature above the softening temperature but below the melting temperature, while plastically forming the element to the desired shape of the cover.

9. A method of producing a cover for installation for an inflatable bag in a vehicle, the method comprising injection moulding a thermo-plastic material which is reinforced with fibres which are stochastically orientated and substantially evenly distributed through the cover at the end of the moulding process.

10. A method according to claim 8 and claim 9 wherein a metal element is located within the mould before the thermoplastic is introduced into the mould, the element being provided with cut-outs, the plastic material, being pressed through the cut-outs during the moulding process so that the metal element is secured to the cover at the end of the moulding process.

11. A method according to any one of the preceding claims wherein the fibres comprise glass fibres.

12. A method according to any one of the preceding claims wherein the thermo-plastic material is polypropene or polyamide.

13. A method of producing a cover according to any one of claims 8 to 12 wherein the thermo-plastic material is polybuteneterphthalate.

14. A cover for an installation for an inflatable bag in a vehicle substantially as herein described with reference to and as shown in the accompanying drawings.

15. An installation for an inflatable bag in a vehicle when provided with a cover substantially as herein described and with reference to and as shown in the accompanying drawings.
16. A method of producing a cover for an installation for an inflatable bag in a vehicle substantially as herein described with reference the accompanying drawings.
17. Any novel feature or novel combination of features disclosed herein.

Relevant Technical fields

(i) UK CI (Edition) B7B (BSB)

Search Examiner

P EVERETT

(ii) Int CL (Edition) B60R

Databases (see over)

(i) UK Patent Office

Date of Search

30 APRIL 1992

(ii) ONLINE DATABASE: WPI

Documents considered relevant following a search in respect of claims

1-7

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	EP 0367324 A2 (KREUZER) and US 5085463	1,2,5 4

SF2(p)

up - c:\wp51\doc99\fil000234

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

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P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

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